



Assessment #1
THE BENCH

Name: _____

Teacher:

Ms. Luk & Mr. Slosberg

Task Timeline: **Criterion C – Friday, September 14, 2012**
Quiz – Friday, September 21, 2012
Criterion A – Friday, October 12, 2012
Criterion D – Monday, October 15, 2012

INSTRUCTIONS:

- ◆ Read the rubric carefully.
- ◆ Show all work, steps and proper units.
- ◆ Ask the teacher for scrap paper, but any work on the scrap paper will **NOT** be marked.
- ◆ Type in pages and upload to Turn It In.

ASSESSMENT:

- ◆ You are an architect creating a bench using functions. You will write up your report in several sections:
 - ✧ **Introduction** – Why are you designing the bench? Where will the finished bench be?
 - ✧ **Initial Bench Research** – What do you need to know about benches to design one yourself? What measurements of the human body do you need? How will you get them? What information about benches will be helpful? This section should have many footnotes.
 - ✧ **Initial Function Research** – What functions would you like to use? How do you transform them to make your bench to scale? How can you cut a function and just use part of it?
 - ✧ **Initial Bench Design** – What will your bench look like? This section should include an **initial sketch** as well as detailed **measurements**. For criterion A, you will be designing functions to fit these measurements and they must be to scale. For criterion D, you will be looking at how accurate the functions were in modelling your bench. It is therefore important that you give a specific number here so you can calculate the percentage error later.
 - ✧ **Bench Design** – Explain how you calculated at least 4 different functions. Include your knowledge of transformations.
 - ✧ **Final Sketch** – Include a scale drawing of your final bench. This should be created on Quick Graph, Geogebra, Autograph, or any other graphical program you like. You may add background (people, trees, etc.) if you like.
 - ✧ **Reflection** – What worked and what didn't in your bench? What real world implications are there in your bench design? What was the degree of accuracy between your initial bench design and your final sketch? What improvements would you make in the future in terms of how you went about solving this problem?
 - ✧ **Bibliography** – Include any software used as well as books or websites referenced in the introduction.

Criterion C: COMMUNICATION IN MATHEMATICS

- ✧ Introduction
- ✧ Initial Bench Research
- ✧ Initial Function Research
- ✧ Initial Bench Design
- ✧ Bibliography

Your design needs to be **communicated** effectively for your manager, the client, and the manufacturing department who will use it to make the actual bench. This means that all graphs will be clearly labeled, and all appropriate diagrams and charts will be explained. Equations will have to connect sensibly to appropriate units of distance.

Any software used will have to be cited and, if necessary, explained.

Achievement level	Task Specific Rubric	IBO Published Descriptor	Student's self-evaluation
0	The student does not reach a standard described by any of the descriptors given below.	The student does not reach a standard described by any of the descriptors given below.	
1–2	<u>Initial Sketch</u> – Missing or Unclear <u>Measurements</u> – Missing or Not Clearly Labeled <u>Initial Function Research</u> – Hard to Follow <u>Bibliography</u> – Absent	<ul style="list-style-type: none"> The student shows basic use of mathematical language and/or forms of mathematical representation. The lines of reasoning are difficult to follow. 	
3–4	<u>Initial Sketch</u> – A clear titled sketch with important parts labeled & includes proper units. <u>Measurements</u> – Measurements are either in a table using labels from the sketch (better) or directly on the sketch. Most measurements are followed by the correct unit. <u>Initial Function Research</u> – At least 3 function transformations are detailed with a parabola. Screen shots demonstrate what paragraphs describe. It is clear how to make a given transformation. <u>Bibliography</u> – Bibliography includes title, author, date, and web address (if appropriate) for each source. Software used is included.	<ul style="list-style-type: none"> The student shows sufficient use of mathematical language and forms of mathematical representation. The lines of reasoning are clear though not always logical or complete. The student moves between different forms of representation with some success. 	Teacher's Final Grade
5–6	<u>Initial Sketch</u> – A clear sketch with title & caption is included with important parts labeled & includes a scale with proper units. <u>Measurements</u> – Measurements are in a table using labels from the sketch. Every measurement is followed by the correct unit. <u>Initial Function Research</u> – At least 5 function transformations are detailed with a parabola and at least one other function. Screen shots have titles & captions and demonstrate what paragraphs describe. It is clear how to make a given transformation. <u>Bibliography</u> – Bibliography is in proper format with hanging indent and in alphabetical order. Software, websites, and other sources are included. Lots of footnotes.	<ul style="list-style-type: none"> The student shows good use of mathematical language and forms of mathematical representation. The lines of reasoning are concise, logical and complete. The student moves effectively between different forms of representation. 	(0-8)

Criterion C – Rough Draft – Self Assessment

Have you included...

- ✧ Introduction
- ✧ Initial Bench Research
- ✧ Initial Function Research
- ✧ Initial Bench Design
 - ◆ Initial Sketch
 - ◆ Measurements
- ✧ Bibliography

Look at each of the following areas and put a tick mark in the box you think you have fulfilled.

Criterion C	Initial Sketch	Measurements	Functions	Transformations	Figures	Footnotes	Bibliography
Level 1-2	Missing Unclear	Missing Unclear	None	1 or more	Plain	Missing	Missing
Level 3-4	Labels Units Title	On Sketch Most Units	Parabolas	3 or more	Titles	Author Date	Title Author Date Website
Level 5-6	Scale	In Table All Units	One Additional Function	5 or more	Captions	Proper Format	Alphabetical Order Hanging Indent Proper Format



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Name: _____ Teacher: _____

Ms. Luk & Mr. Slosberg

Task Timeline: **Criterion A – Friday, October 12, 2012**
Criterion D – Monday, October 15, 2012

INSTRUCTIONS:

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 - ✧ **Bench Design** – Explain how you calculated at least 4 different functions. Include your knowledge of transformations. Read the rubric carefully to see how to get full marks here.
 - ✧ **Final Sketch** – Include a scale drawing of your final bench. This should be created on Quick Graph, Geogebra, Autograph, or any other graphical program you like. You may add background (people, trees, etc.) if you like.
 - ✧ **Reflection** – What worked and what didn't in your bench? What real world implications are there in your bench design? What was the degree of accuracy between your initial bench design and your final sketch? What improvements would you make in the future in terms of how you went about solving this problem?
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Criterion A: KNOWLEDGE AND UNDERSTANDING

Here you show your **knowledge and understanding** of quadratic equations and their graphs. You **MUST** provide all the appropriate information about your design specification including:

- Accurate plots of all graphs, showing the important features of the design;
- Sets of equations describing all curves used and listing the range of x-values;
- The process (mathematics) by which you came up with the equations used in the design including possible modifications that could be made if requested by the client.

In order to score top marks in this criterion, you should show how you have used your knowledge in **unfamiliar situations** by embedding and develop at least one function that has not been covered in class, such as a cubic.

Achievement level	Task Specific Rubric	IBO Published Descriptor	Student's self-evaluation
0	The student does not reach a standard described by any of the descriptors given below.	The student does not reach a standard described by any of the descriptors given below.	(0-8)
1–2 Simple	Only a single simple function ($y=mx+b$) was transformed using a single transformation.	The student generally makes appropriate deductions when solving simple problems in familiar contexts.	
3–4 Complex	Two more complex functions ($y=a(x-h)^2+k$) were transformed using two of reflection, translation or stretch.	The student generally makes appropriate deductions when solving more complex problems in familiar contexts.	Teacher's Final Grade
5–6 Challenging	At least three functions (including parabolas) were transformed using all three transformations; at least one challenging transformation (a compound transformation) is present. Domain and range for each function is specified.	The student generally makes appropriate deductions when solving challenging problems in a variety of familiar contexts.	(0-8)
7–8 Unfamiliar	At least four functions are transformed including a compound transformation and an unfamiliar function.	The student consistently makes appropriate deductions when solving challenging problems in a variety of contexts including unfamiliar situations.	



Assessment #1

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Task Timeline: **Criterion D – Monday, October 15, 2012**

INSTRUCTIONS:

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Criterion D: REFLECTIONS & EVALUATIONS

Before you begin your design, it is important that you come up with a set of specifications so the client can see how comfortable, sheltered, and creative your design will be. You need to **reflect** (and possibly research) on associated real-life issues, such as:

- People's sizes and comfort levels;
- How people sit or lounge;
- How the sun and the rain act;
- How easily the bench might be to store away;
- Any other features that you believe may be relevant to the product.

Once you have finished your design, please **evaluate** it against the specifications you listed before you began. Consider how well your model fits your specifications by checking the degree of accuracy (possibly percentage error or sig. fig.). Because the client wants the initial design in just a few days, there may well be a number of things you cannot do. If you had more time, suggest what other things you might do to improve your product? What different mathematical methods might you have tried?

Achievement level	Task Specific Rubric	IBO Published Descriptor	Student's self-evaluation
0	The student does not reach a standard described by any of the descriptors given below.	The student does not submit a poster. Or, the students submit work with unacceptable quality.	
1–2 Real Life	Do your results make sense? Does the set of functions you have created look like a chair? Analyze your chair in a real world context. Would you like to sit in it? Why or why not? How could the chair be improved as a chair?	The student attempts to explain whether his or her results make sense in the context of the problem. The student attempts to describe of his or her findings in connection to real life where appropriate.	
3–4 Degree of Accuracy	How close do your functions come to fitting the parameters you came up with designing the chair? Take your measurements from the table in your initial design and find the percentage error in your final design.	The student correctly but briefly explains whether his or her results make sense in the context of the problem. The student describes the importance of his or her findings in connection to real life where appropriate. The student attempts to justify the degree of accuracy of his or her results where appropriate.	Teacher's Final Grade
5–6 Improvements	How could you have done the math differently to make your work easier?	The student critically explains whether his or her results make sense in the context of the problem. The student provides a detailed explanation of the importance of his or her findings in connection to real life where appropriate. The student justifies the degree of accuracy of his or her results where appropriate. The student suggests improvements to his or her method where appropriate.	
			(0-8)



IB MYP YEAR 5

Year 10 Standard Mathematics

Assessment #1

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Task Timeline: **Criterion D – Monday, October 15, 2012**

This is a quick check to ensure that each person has done their own work.

Your teacher will select one function from your final sketch and write it here:

Please describe the transformations used in this function. Start with the initial function and build it up step by step.